What is Claimed:

1.   A method comprising:

receiving an image;

identifying boundary data objects in the image, each boundary data object representing a point in the image having a specified orientation;

selecting a primary angle that describes a potential orientation of a generally rectangular shaped object in the image;

finding a first set of lines defined by groups of boundary data objects that lie generally along the direction of the primary angle;

finding a second set of lines defined by groups of boundary data objects that lie generally along a direction orthogonal to the primary angle; and

locating pairs of lines from the first set of lines and pairs of lines from the second set of lines that together form the four sides of the generally rectangular shaped object.

2.   The method of claim 1, wherein finding the first set of lines includes assigning a score value to each line in the first set of lines based on the likelihood that each said line corresponds to a side of the rectangle.

3.   The method of claim 2, wherein the score value for each said line is computed based on the number of boundary data objects contributing to the line.

4.   The method of claim 3, wherein the score values are used in locating the pairs of lines that form the four sides of the generally rectangular shaped object.

5.   The method of claim 1, wherein the act of locating pairs of lines from the first and second set of lines additionally includes refining the pair of lines from the first set of lines by re-calculating the pair of lines from the first set of lines as a pair of lines having a slope equal to an average of the slope of the unrefined pair of lines.

6.   The method of claim 5, wherein the act of locating pairs of lines from the second set of lines additionally includes refining the pair of lines from the second set of lines by re-calculating the pair of lines from the second set as a pair of lines having a slope equal to the negative reciprocal of the average slope of the pair of lines of the first set.

7.   The method of claim 1, further including:

successively incrementing the primary angle and repeating the acts of finding the first set of lines, finding the second set of lines, and locating the pairs of lines for each said increment of the primary angle, wherein

rectangles corresponding to the generally rectangular shaped object are located in any of the increments of the primary angle.

8.   A method comprising:

receiving an image of a surface mounted device (SMD) for a printed circuit

board, the SMD having a generally rectangular shape;

automatically generating an abstract model of the SMD based on the received

image, the abstract model including at least the length and width of dominate edges in

the SMD that contribute to the rectangular shape of the SMD; and

training an object location algorithm, based on the generated abstract model, to

locate the SMD in succeeding images.

9.   The method of claim 1, wherein the abstract model additionally includes

position and orientation information of the SMD in the received image.

10.   The method of claim 1, wherein automatically generating the abstract

model additional comprises:

extracting boundary data objects in the image, each boundary data object

representing a point in the image;

selecting a primary angle that describes a potential orientation of the SMD;

finding a first set of lines defined by groups of boundary data objects that lie

generally along the direction of the primary angle;

finding a second set of lines defined by groups of boundary data objects that lie

generally along a direction orthogonal to the primary angle; and

locating pairs of lines from the first set of lines and pairs of lines from the second

set of lines that together form the dominant edges in the SMD.

11.   A computer system comprising:

a processor; and

a computer memory, the computer memory containing at least one image of an

object having a generally rectangular shape and containing computer instructions,

which, when executed by the processor, identifies boundary data objects, based on the

image of the object, at a primary angle and at an angle orthogonal to the primary angle,

and locates pairs of parallel lines in each of the primary angle and the angle orthogonal

to the primary angle; wherein

the computer system identifies edges of a rectangle generally describing the

rectangular shaped object based on the pair of parallel lines.

12.   The computer system of claim 11, further including an image formation

unit connected to the processor and configured to generate the at least one image.

13.   A computer readable medium containing computer instructions, that when executed by a processor, locates rectangles corresponding to a generally rectangular shaped object in an image by causing the processor to:

receive an image having at least one generally rectangular shaped object;

identify boundary data objects in the image, each boundary data object representing a point in the image having a specified orientation;

select a primary angle that describes a potential orientation of the generally rectangular shaped objects in the image;

find a first set of lines defined by groups of boundary data objects that lie generally along the direction of the primary angle;

find a second set of lines defined by groups of boundary data objects that lie generally along a direction orthogonal to the primary angle; and

locate pairs of lines from the first set of lines and pairs of lines from the second set of lines that together form the four sides of the generally rectangular shaped object.

14.   The computer readable medium of claim 13, wherein finding the first set of lines includes assigning a score value to each line in the first set of lines based on the likelihood that each said line corresponds to a side of the rectangle.

15.   The computer readable medium of claim 14, wherein the score value for each said line is computed based on the number of boundary data objects contributing to the line.

17

16.   The computer readable medium of claim 15, wherein the score values are used in locating the pairs of lines that form the four sides of the generally rectangular shaped object.

17.   The computer readable medium of claim 13, wherein the act of locating pairs of lines from the first and second set of lines additionally includes refining the pair of lines from the first set of lines by re-calculating the pair of lines from the first set of lines as a pair of lines having a slope equal to an average of the slope of the unrefined pair of lines.

18.   The computer readable medium of claim 17, wherein the act of locating pairs of lines from the second set of lines additionally includes refining the pair of lines from the second set of lines by re-calculating the pair of lines from the second set as a pair of lines having a slope equal to the negative reciprocal of the average slope of the pair of lines of the first set.

19.   The computer readable medium of 13, the computer instructions further causing processor to:

successively increment the primary angle and repeating the acts of finding the first set of lines, finding the second set of lines, and locating the pairs of lines for each said increment of the primary angle, wherein

rectangles corresponding to the generally rectangular shaped object are located in any of the increments of the primary angle.

18